Necroscia prasina (Burmeister), a common red-winged phasmid in Borneo

P.E. Bragg, 8 The Lane, Awsworth, Nottingham, NG16 2QP, U.K.

Abstract

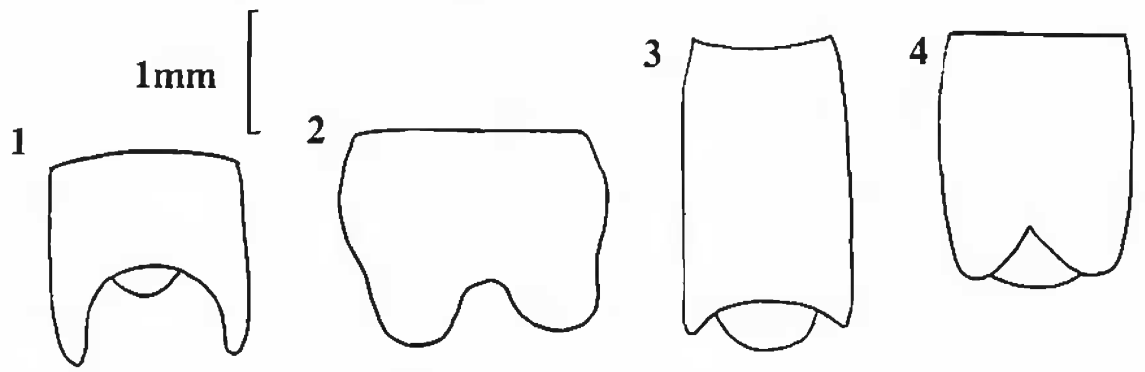
Necroscia prasina is a widespread, common species of phasmid in Borneo. Although brightly coloured, identification is not simple. The male, female and egg are described and illustrated. Illustrations of the similarly coloured West Malaysian *Necroscia inflata* are provided for comparison.

Key words

Phasmida, *Necroscia prasina*, Borneo.

Introduction

Necroscia prasina (Burmeister) was the first species of phasmid to be described from Borneo. It is common and widespread in Borneo, and it has also been recorded from Java, Sumatra, the Philippines, Singapore and West Malaysia. The typical coloration of green body and red wings is very striking but there are a number of similarly coloured species in Borneo, in addition the coloration is variable and there are several similarly sized and proportioned species. Brock's key to West Malaysian species of *Necroscia* (Brock, 1999: 93) uses the coloration of the wings to distinguish this species from the similarly coloured *Necroscia inflata* (Redtenbacher). The coloration of my own Bornean material of *N. prasina* is such that it can not be used to distinguish it from my West Malaysian and Singaporean specimens of *N. inflata*. Colour is therefore only of limited value in identifying this species. Examination of the terminal abdominal segments is a reliable method of distinguishing both the males and female of these two species (Figs. 1-4).



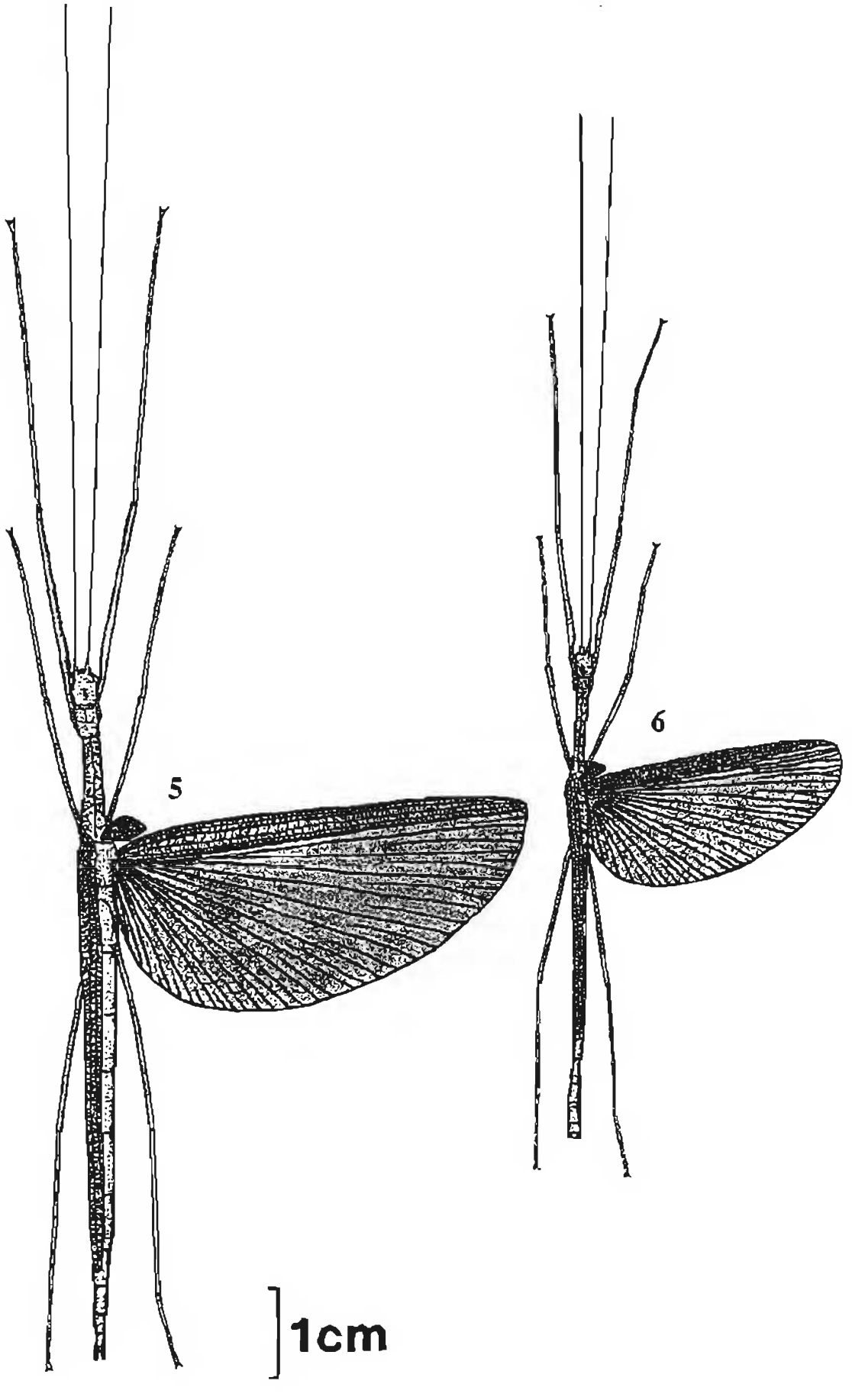
Figures 1-4. Apex of abdomen: **1.** *Necroscia prasina*, male; **2.** *Necroscia inflata*, male; **3.** *Necroscia prasina*, female; **4.** *Necroscia inflata*, female.

Taxonomy

Necroscia prasina belongs to the Necrosciinae, the largest group of phasmids in Borneo. This species has been described as new by three different authors: Burmeister (1838), Audinet-Serville (1838) and Redtenbacher (1908).

The valid name for the species is *Necroscia prasina* (Burmeister) since Burmeister's publication of 1838 pre-dates Audinet-Serville's publication of *Phasma roseipennis* (which was in the last week of December 1838). However, for many years most authors used the name *Necroscia roseipennis*.

Burmeister described his species in the genus *Phasma*, as *Phasma prasinum*. Audinet-Serville described a different species, from South America, and gave it the same name. These two are therefore homonyms (two different species with the identical name). Westwood (1859) recognised this and proposed the replacement name *Necroscia burmeisteri*, for *Phasma prasinum* Burmeister; however, this is invalid because he replaced the senior name when he should have replaced the junior name. *Phasma prasinum* Audinet-Serville has



Figures 5-6. *Necroscia prasina* (Burmeister), 5. Female; 6. Male.

recently been replaced with *Citrina servillei* Zompro (2000: 94).

Necroscia prasina has been mentioned in the literature on numerous occasions, although often as *Necroscia roseipennis*; a complete list of references is given in the synonymy below.

Necroscia prasina **(Burmeister, 1838)**

Phasma prasinum Burmeister, 1838: 586. Lectotype ♀ (ZMHB) Borneo; Paralectotype ♀ (not located by Brock, 1996a) Java [Lectotype designation by Brock, 1996a: 91].

Necroscia prasina (Burmeister); Brock, 1999: 97, figs 60a-b (♂), 60c-d (♀); Bragg, 2001: 573, figs 227A (♂), 227B (♀), 227C-D (egg).

Necroscia burmeisteri Westwood, 1859: 151; Kirby, 1904: 376. [An invalid replacement name for *Phasma prasinum* Burmeister, not *P. prasinum* Audinet-Serville].

Necroscia roseipennis Audinet-Serville, 1838: 252; Westwood, 1859: 151; Kirby, 1904a: 437; Kirby, 1904b: 376; Karny, 1923: 241; Günther, 1943: 165; Hausleithner, 1991: 221; Seow-Choen *et al.*, 1994a: 11 fig 2 (♂); Seow-Choen *et al.*, 1994c: 71, pl. OO.1 (♀), OO.2 (♀), PP.3 (♂ & ♀), PP.4 (♂); Seow-Choen *et al.*, 1994d: 394, fig (♂ & ♀); Brock, 1996a: 91. Syntypes ♂ & ♀ (Audinet-Serville's collection) Java. Synonymised by Redtenbacher, 1908: 526 [using *roseipennis* as the senior name].

Phasma (Necroscia) roseipenne Audinet-Serville; de Haan, 1842: 121.

Aruanoidea roseipennis (Audinet-Serville); Redtenbacher, 1908: 526. pl. 27.10a-b (♀); Werner, 1934b: 3.

Aruanoidea connexa Redtenbacher, 1908: 525. Holotype ♀ (NHMW, 1032) Malaysia, coll. Jachau. Synonymised by Brock, 1996a: 91.

Material examined

In the following list SMSM refers to the Sarawak Museum in Kuching. PEB refers to material in my own collection, these specimens were collected by myself unless otherwise indicated. The SMSM material has been used solely for the distribution map; the descriptions are based on my own material only. Measurements in table 1 are taken from my longest and shortest specimens.

BRUNEI

Locality not specified: ♀ (SMSM-335) Waterstradt van der Poll [no date].
Badas: ♂ (PEB-2365) 31.x.1994; ♀ (PEB-2361). ♂ (PEB-2364) 01.xi.1994.
Teraja, waterfall trail: ♀ (PEB-2363) 03.xi.1994.

SABAH

Mt Kinabalu Park, near Park HQ, 1580m: ♂ (PEB-1709) 30.viii.1992.

SARAWAK

Lundu: ♀ (SMSM-332) 24.xi.1915.
Trusan: ♀ (SMSM-333) xi.1902.
Kuching: ♂ (SMSM-334) 01.ii.1896.
Santubong: ♂ (SMSM-487) 20.iv.1970; ♀ (SMSM-488) 15.iv.1970.
Bengoh: ♂ (PEB-1044) 28.vii.1989.
43km NE of Selangau: ♂ (PEB-2347), ♀ (PEB-2348), ♀ (PEB-2362) 26.x.1994.
Mt Serapi, 90m: ♀ (PEB-1601), eggs (PEB-1602) 05.viii.1992
Mt Serapi, 120m: ♀ (PEB-897) 26.vii.1991.
Mt Serapi, 240m: ♀ (PEB-894) 28.vii.1991.
Mt Serapi, 600m: ♀ (PEB-893) 13.viii.1990.
Mt Serapi, 670m: ♂ (PEB-896) 27.vii.1991.
Mt Serapi, 700m: ♀ (PEB-898) 27.vii.1991; ♀ (PEB-1575) 14.viii.1992.
Mt Serapi: ♀ (PEB-1043) 12.viii.1989; ♀ (PEB-1875) collected by Ricky Lee, viii.1992
Simunjan: ♀ (PEB-895) 17.viii.1991.

Distribution (Fig. 7).
This species has quite a widespread distribution; it has been recorded from Java, Borneo, Sumatra, the Philippines, West Malaysia, and Singapore. Within Borneo it has previously been recorded from Babaggon (Hausleithner, 1991), Pontianak and Barito River (de Haan, 1842), and Mahakam (Günther, 1943). Although it probably relates to the region around Banjarmasin, de Haan's record for Barito River is not plotted on the distribution map since it is very long, almost bisecting Kalimantan; Günther's record for the Mahakam river relates to somewhere within, or close to, the large circle (Bragg, 2001: 47).

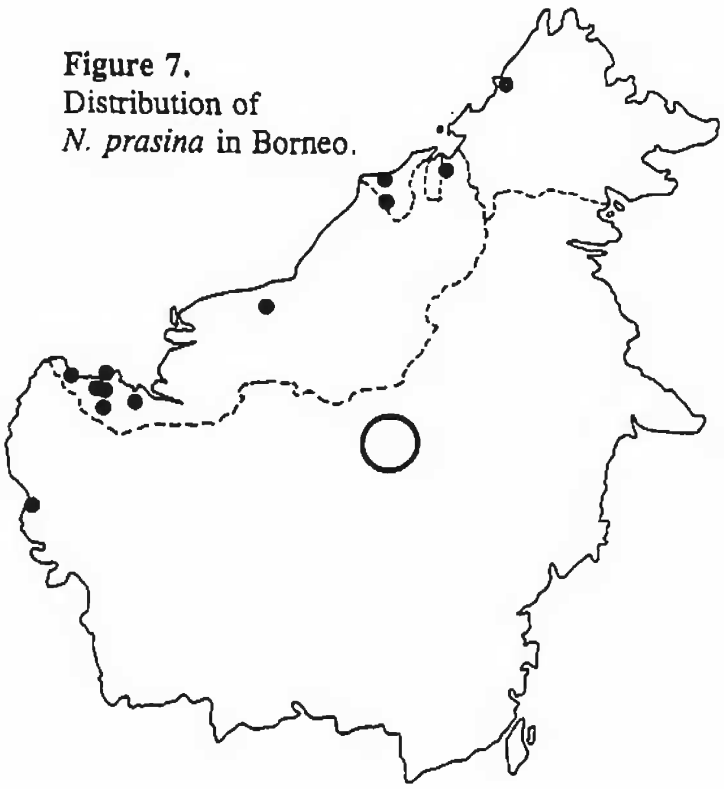


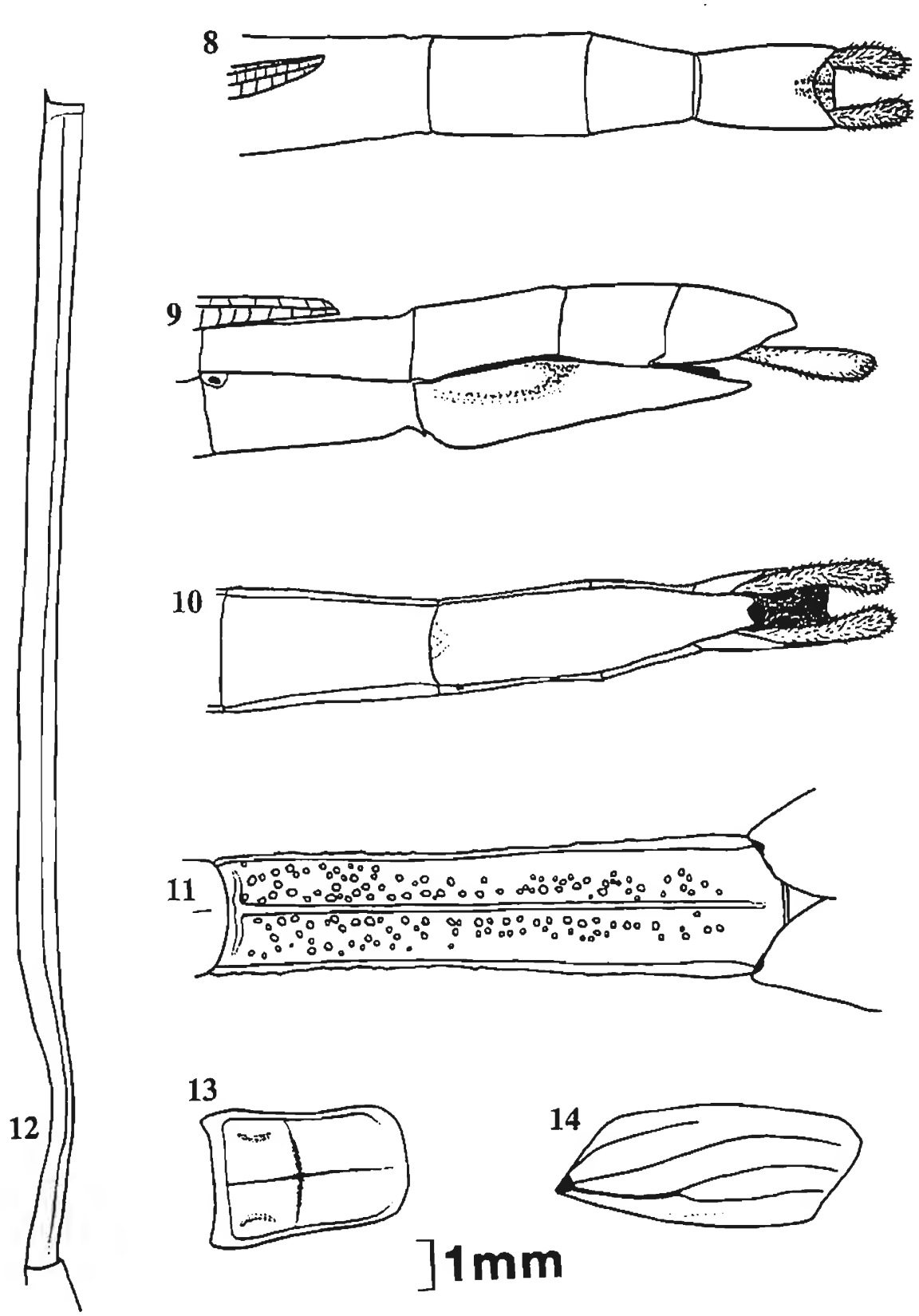
Figure 7.
Distribution of
N. prasina in Borneo.

Female (Figs. 3, 5 & 8-14).
Head, body, legs and costal region of the wings usually mid-green, occasionally brown; the portion of the abdominal nota covered by the wings is reddish; anal region of wings pale pink to red, occasionally overlaid with a greyish tinge. Head with a longitudinal pale, almost white, line running from the back of each eye; this continues along the lateral margins of the pronotum but is present only very indistinctly on the mesonotum; the radial vein of the hind wing tends to be paler than the rest, giving the impression that the pale stripe continues along the whole insect. In live specimens the underside of the body may appear to be white. Eyes are brown or reddish brown. Antennae dark, becoming slightly lighter distally. Mesothorax granulose, rest of body smooth. Body length 71-81mm, full measurements in table 1, width of middle of mesonotum about 2.2mm.

Head flat, with eyes projecting prominently from the side. Head about one fifth longer than wide (excluding the eyes), of similar width if the eyes are included. Head with a slight longitudinal furrow and three ocelli. Basal segment of antennae twice as long as wide, flattened; second segment cylindrical, almost half as long as first and only slightly narrower; remainder half as wide as second, indistinctly segmented.

Pronotum (Fig. 13) one-and-a-half times longer than wide, broadest at the anterior, narrowest in the middle, anterior margin slightly indented; with a curved transverse groove just anterior of the mid point, with a slight longitudinal groove. Mesonotum granulose, granules extending the full width at the anterior but restricted to an area close to the centre line at the posterior (Fig. 11); mesonotum with a raised central longitudinal ridge and raised granulose margins. Mesopleurae with a narrow longitudinal band of granules. Mesosternum sparingly granulose. Metanotum and median segment usually obscured by the elytra and wings, metanotum very slightly longer than median segment.

Segments 2-7 of almost uniform width (about 3.5mm); 2-6 of equal length, 7th about two-thirds as long. Segments 8-10 narrowing, 8th and 10th only slightly longer than wide, 9th as wide as long. Postero-lateral corners of 10th projecting (Figs. 3 & 8). Lamina



Figures 8-14. *N. prasina*, female. **8-10.** Abdomen: dorsal, lateral & ventral views; **11.** Mesonotum; **12.** Right fore femur, dorsal view; **13.** Pronotum: **14.** Left elytron.

supraanalis rounded, projecting just beyond the postero-laterals of the 10th segment. Operculum reaching almost to the posterior of 10th tergum, with anterior end almost semi-circular in cross-section, reducing in height towards the rear, with a "V" shaped notch in the posterior margin (Fig. 10); there is a depression near the proximal end of the dorsal margin. Cerci prominent, projecting beyond the end of the abdomen, rounded, swollen towards the posterior.

Base of fore femora compressed and curved (Fig. 12). All five carinae are very distinct on the fore legs but rather indistinct, particularly ventrally, on the mid and hind legs. Femora and tibiae all without spines, but with a row of setae on the carinae, these are particularly strong on the fore legs. Basal tarsomere of similar length to combined length of tarsomeres 2-5: slightly longer on fore leg, slightly shorter on middle and hind legs. Elytra rhomboidal when viewed dorsally (Fig. 14), fairly flat. Wings reaching to half way along 7th segment (slightly variable), radial vein unbranched; anal region with all veins red or pink, the membrane between paler pink.

Table 1. *Necroscia prasina* — measurements in mm.

	♂	♀		♂	♀
Total length	49-56	71-81	Fore femora	16.5-19	21-23
Antennae	51-62	70-78(+?)	Fore tibiae	15-17.5	19-22.5
Head	2.3-2.5	3.1-3.9	Fore tarsi	8-10	10.5-11
Pronotum	2.1-2.3	3.8-4.0	Mid femora	11-13.5	13-15
Mesonotum	7.8-8.7	21-22.5	Mid tibiae	9.5-11.5	11-13.5
Metanotum	3.6-4.8	6.5-7.5	Mid tarsi	5-6	6.5-7.0
Median segment	3.4-4.2	6.0-6.5	Hind femora	15.5-17	18-20
Elytra	3.0-3.6	5.2-6.1	Hind tibiae	14-17	15.5-17.5
Hind wing	26-30	45-47	Hind tarsi	7-7.5	8-8.5

Male (Figs. 1, 6 & 15-18).

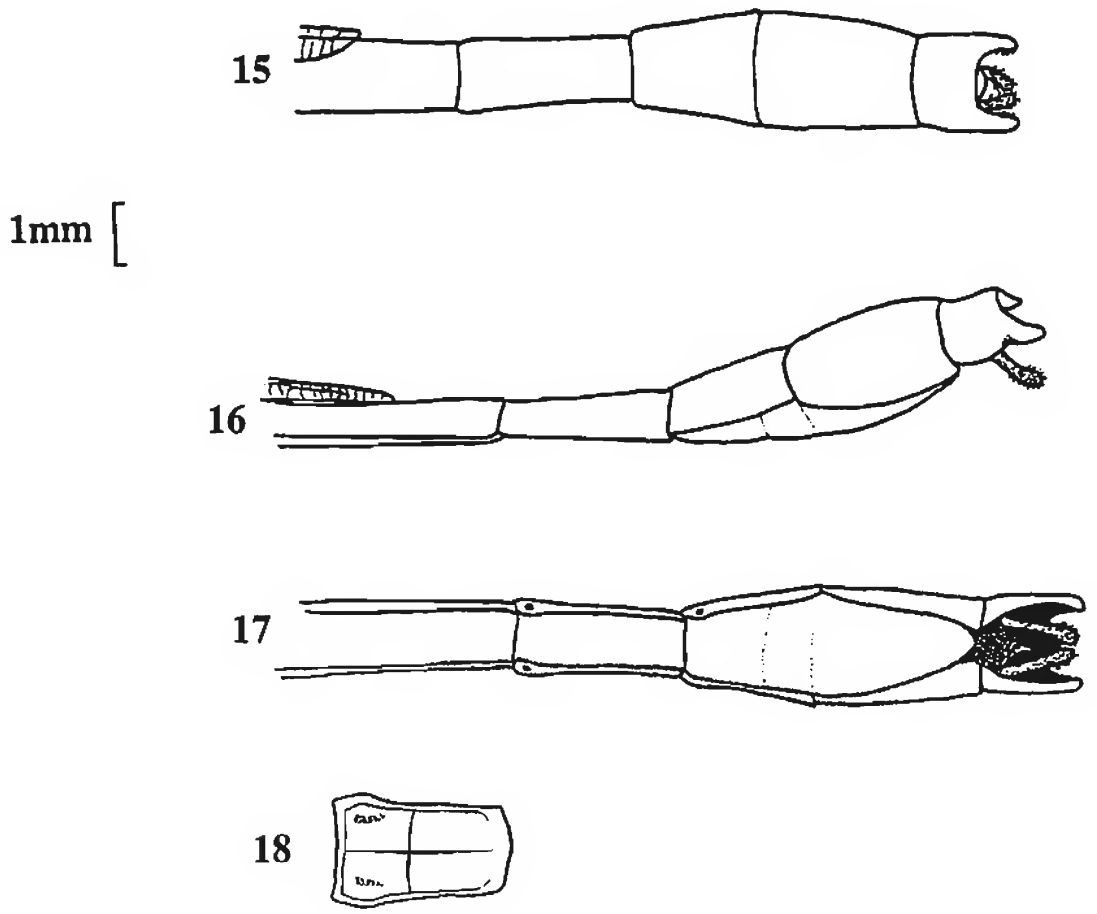
Coloration as in the female, but one male has green eyes. Body proportions similar to female but more slender, width of middle of mesonotum about 1.5mm. Body length 49-56mm, full measurements in table 1.

Head about one-and-a-half times longer than wide (excluding eyes), as long as wide with eyes included. Otherwise as in female.

Thorax, including granulation, as in female.

Abdominal segments 2-6 of equal length and narrowing only very slightly, about four times longer than wide; 7th of similar width but only about half as long. Segments 8th widening to almost double the width of 7th; 9th and 10th of equal width to posterior of 8th. Segments 8 & 9 slightly shorter than 7th. Tenth segment only slightly more than half the length of 9th, postero-lateral corners project greatly, at the centre line the 10th segment is only one quarter as long as 9th segment. Postero-lateral corners of 10th with about 20 hooked teeth on the ventral surface. The joints between segments 7-10 have a rounded depression, usually brown in colour. Lamina supraanalis semi-circular with a longitudinal carina, usually clearly present but not projecting beyond the postero-lateral corners of the 10th segment; in preserved material at least the lamina supraanalis may be folded under the 10th segment. Poculum reaching to the end of the 9th dorsum, rounded, smooth. Cerci not as prominent as in the female, swollen, club-like.

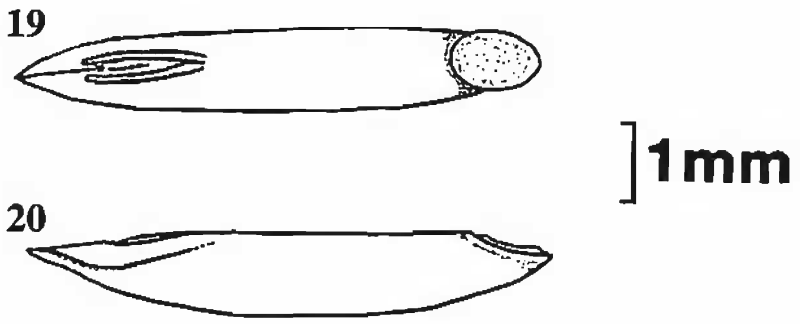
Legs as in female, except basal tarsomeres which are slightly longer than tarsomeres 2-5 on both the fore and hind legs, slightly shorter on mid leg. Wings reaching to half way along 6th segment, otherwise as in the female.



Figures 15-18. *Necroscia prasina*, male; **15-17.** Apex of abdomen: dorsal, lateral & ventral views; **18.** Pronotum.

Egg (Figs. 19-20).
Capsule cylindrical with polar end almost conical, dorsal surface straight, ventral surface curving at each end. Opercular angle about +90°. Capsule and operculum almost smooth (very finely punctate); polar end with three short ridges. Capsule light grey, darker at the opercular end of dorsal surface, ridges at polar end black. Micropylar plate close to polar end, long and slender with a groove in the capsule on each side of the plate. Capsule length 7.0mm, height 1.0mm, width 1.0mm.

Comments
Seow-Choen *et al.* (1994c) report various colour forms in West Malaysia but do not state the frequency of the different forms. Only one of the 19 specimens in my collection is brown; I have found more green specimens than I have collected, but I have only found the single



Figures 19-20. Egg of *Necroscia prasina*, **19.** Dorsal view. **20.** Lateral view.

brown specimen, a female (PEB-2348) from roadside vegetation 43km NE of Selangau. My green bodied specimens have wings with variously coloured anal regions, ranging from pale pink to the more common red, one male (PEB-2347) has an equal mixture of grey and pink, a green female (PEB-2362) from the same locality also has some grey mixed with the pink. Seow-Choen *et al.* also clearly state, and show in colour photographs, that the antennae have seven white bands distally. These bands do not occur in my preserved Bornean material and are not present on any of my photographs of live material in Borneo; it is possible that this is a geographical variation.

My material has been collected at various altitudes, from 90-1580m. Altitude does not appear to have any effect on size, the specimen from 1580m falls within the range of sizes found in lowland areas. I have found this species in most areas where I have collected for more than one night, including on the fringes of peat-swamp forest at Simunjan; however, I did not find this species during a two-week stay in a peat-swamp at Kelambenkari in Kalimantan Tengah in 1993 although another red-winged species *Marmessoidea quadriguttata* (Burmeister) was common in the area. Similarly, I did not find this species during a 12 night stay in primary lowland forest at Kuala Belalong in Brunei. It is possible that this species prefers secondary forest, one of the foodplants, wild cinnamon only reaches about 10m in height (Seow-Choen *et al.*, 1994c); cinnamon is therefore likely to be more common in secondary forest.

In my own Bornean collection there are eight other similarly coloured species (i.e. green with pink or red wings) of various sizes. At least two of these have females which could easily be confused with *Necroscia prasina*: one of these also has almost identical terminal segments but may be distinguished, with the aid of a microscope, by the shape of the operculum, head, and base of the fore legs.

One would expect brightly coloured phasmids to be easily to identify compared to the more common dull species. Whilst identification of such species is relatively easy, there are still problems caused by variation in coloration and by original descriptions and illustrations which are inadequate for distinguishing similar species.

References

Audinet Serville, J.G. (1838) *Histoire Naturelle des Insectes. Orthoptères*. Paris.

Bragg, P.E. (2001, in press) *Phasmids of Borneo*. Natural History Publications (Borneo), Kota Kinabalu, Sabah.

Brock, P.D. (1996a) Catalogue to stick and leaf-insects (Insecta: Phasmida) associated with Peninsular Malaysia and Singapore. *Malayan Nature Journal*, 49(2): 83-102. [Journal is dated November 1995 but was published 26.ii.1996]

Brock, P.D. (1999) *Stick and Leaf Insects of Peninsular Malaysia and Singapore*. Malaysian Nature Society, Kuala Lumpur.

Burmeister, H. (1838) *Handbuch der Entomologie*, Volume 2. Berlin.
Günther, K. (1943) Die Phasmoiden (Orthoptera) der "Borneo-expedition Dr. Nieuwenhuis" aus dem Stromgebiet des oberen Mahakam. *Eos Madrid*, **19**: 149-172.
Haan, W. de (1842) Bijdragen tot de Kennis Orthoptera. in C.J. Temminck, *Verhandelingen over de natuurlijke Geschiedenis der Nederlandsche overzeesche Bezittingen*. volume 2.
Hausleithner, B. (1991) Eine Phasmidenausbeut aus dem Gebiet des Mount Kinabalu, Borneo (Phasmatodea). *Nachrichten des Entomologischen Vereins Apollo, Frankfurt*, N.F. **11**(4): 217-236.
Karny, H.H. (1923) Zur Nomenklatur der Phasmoiden. *Treubia*, **3**(2): 230-242.
Kirby, W.F. (1904a) Notes on Phasmidae in the collection of the British Museum (Natural History), South Kensington, with descriptions of new genera and species. - No. II. *Annales and magazine of natural History*, (7)**13**: 429-449.
Kirby, W.F. (1904b) *A synonymic Catalogue of Orthoptera*. Vol. **1**. London.
Redtenbacher, J. (1908) *Die Insektenfamilie der Phasmiden*. Vol. **3**. Leipzig.
Seow-Choen, F., Brock, P.D. & Seow-En, I. (1994a) The Stick Insects of Singapore. *Singapore Scientist*, **70**: 10-14.
Seow-Choen, F., Brock, P.D. & Seow-En, I. (1994b) An introduction to the stick and leaf-insects of Singapore. *Malayan Naturalist*, **48**: 7-11.
Seow-Choen, F., Brock, P.D. & Seow-En, I. (1994c), Colour variations of the stick insect *Necroscia roseipennis* Serville (Phasmida = Phasmatodea) in Singapore. *Bulletin of the Amateur Entomologists' Society*, **53**(393): 71-73, pl. OO & PP.
Seow-Choen F., Tay, E.P., Brock, P.D. & Seow-En, I. (1994d) Foodplants of some Stick-insects (Phasmida = Phasmatodea) from Singapore. *Malayan Nature Journal*, **47**(4): 393-396.
Zompro, O. (2000) Designation of type-species of 13 stick-insect genera described by J. Redtenbacher (Insecta: Orthoptera: Phasmatodea). *Annalen des Naturhistorischen Museums in Wein*, **102B**: 93-96.